WHAT IS CLAIMED IS:

1. A ground surface location and identification system comprising:

a location transmitter positioned at a location within a coverage area and having stored therein a physical location code corresponding to the location and configured to provide an optical signal representative of the physical location code; and

a location identifier adapted to couple to an object and having an object identification code representative of the object stored therein, and configured to receive the optical signal and to transmit an identification signal representative of the physical location code and the object identification code.

2. The ground surface location system of claim 1, further comprising:

a plurality of location transmitters positioned at a plurality of locations within the coverage area, each location transmitter having stored therein a corresponding physical location code representative of the location at which it is positioned and each configured to transmit an optical signal representative of the corresponding physical location code.

3. The ground surface location system of claim 2, wherein the location identifier is further configured to receive a plurality of optical signals and to transmit a signal representative of the object identification code and the physical location code of the location transmitter to which the location identifier is in closet proximity.

4. The ground surface location system of claim 1, wherein the location transmitter further comprises:

a light source adapted to receive power from a power source; and

a location encoder having the physical location code stored therein and

configured to generate the optical signal by turning the power to the light source on and off based on the physical location code.

5. The ground surface location system of claim 4, wherein the light source comprises a light emitting diode (LED) array.

6. The ground surface location system of claim 4, wherein the light source comprises a laser diode.

7. The ground surface location system of claim 4, wherein the location encoder comprises:

a power switch connectable to the power source and having a control gate

and configured to provide power to the light source;

a microcontroller having the physical location code stored therein and

configured to provide to the control gate a power switch control signal representative of the physical location code that causes the power switch to turn the power to the light source on and off to generate the optical signal.

8. The ground surface location system of claim 7, wherein the light source is turned on and off at a flash rate above a maximum rate perceptible to humans.

9. The ground surface location system of claim 7, wherein the power switch control signal comprises a serial data stream encoded with the physical location code by the signal processor using the Manchester coding scheme.

10. The ground surface location system of claim 9, wherein the power switch control signal provides a fifty percent duty cycle to the power switch.

11. The ground surface location system of claim 4, wherein the location transmitter further comprises:

an infrared setup port configured to receive an infrared signal representative of a physical location code and to provide the physical location code to the location encoder.

12. The ground surface location system of claim 1, wherein the location identifier further comprises:

an optical receiver configured to receive and convert the optical signal to an electrical signal;

a signal processor having the object identification code stored therein and receiving the electrical signal and providing an object location code representative of the object identification code and the physical location code; and

a transmitter configured to transmit the identification signal, wherein the identification signal is representative of the object location code.

13. The ground surface location system of claim 12, wherein the optical receiver further comprises:

a plurality of optical sensors each configured to receive and convert a separate optical signal representative of a physical location code into a corresponding electrical signal.

14. The ground surface location system of claim 13, wherein the signal processor is configured to receive the corresponding electrical signal from each optical sensor of the plurality of optical sensors and to provide an object location

code representative of the object identification code and the physical location code of the location transmitter to which the location identifier is in closest proximity.

15. The ground surface location system of claim 1, further comprising:

a data receiving system configured to receive the identification signal and to provide identification of the object and its location within the coverage area on a visual display.

16. A location transmitter positioned at a location within a zone and having a physical location code stored therein representative of the location, and configured to provide an optical signal representative of the physical location code.

17. The location transmitter of claim 16, further comprising:

a light source adapted to receive power from a power source; and

a location encoder having the physical location code stored therein and configured to generate the optical signal by turning the power to the light source on-and-off based on the physical location code.

18. The location transmitter of claim 17, wherein the light source comprises an light emitting diode array.

19. The location transmitter of claim 17, wherein the light source comprises a laser diode array.

20. The location transmitter of claim 17, wherein the location encoder further comprises:

a power switch connectable to the power source, the power switch having a control gate and configured to provide power to the light source;

a microcontroller having the physical location code stored therein and configured to provide to the control gate a power switch control signal representative of the physical location code causing the power switch to turn the power to the light source on-and-off to generate the optical signal.

21. The location transmitter of claim 20, wherein the power switch control signal comprises a serial data stream encoded with the physical location code by the microcontroller using a Manchester coding scheme.

22. The location transmitter of claim 21, wherein the power switch control signal provides a fifty percent duty cycle to the power switch.

23. The location transmitter of claim 21, wherein power to the light source is turned on-and-off at a rate causing the light source to flash at a rate not perceptible to human vision.

24. The location transmitter of claim 17, further comprising:
an infrared set-up port configured to receive an infrared signal representative of the physical location code and to provide the physical location code to the location encoder.

25. A location identifier adapted to couple to an object and having stored therein an object identification code representative of the object and configured to receive an optical signal representative of a physical location code corresponding to a location within a zone, and configured to transmit an identification signal representative of the object identification code and the physical location code

26. The location identifier of claim 25, further configured to receive a plurality of optical signals, each representative of a physical location code and corresponding to a different location within the zone, and configured to transmit an identification signal representative of the object identification code and the physical location code corresponding to the location within the zone to which the location identifier is in closest proximity.

27. The location identifier of claim 25, further comprising:

an optical receiver configured to receive and convert the optical signal to an electrical signal;

a signal processor having the object identification code stored therein and configured to receive the electrical signal and to provide an object location code representative of the object identification code and the physical location code; and

a transmitter configured to transmit an identification signal representative of the object location code.

28. The location identifier of claim 27, wherein the optical receiver further comprises:

a plurality of optical sensors each configured to receive and convert a separate optical signal representative of a physical location code into a corresponding electrical signal.

29. The location identifier of claim 28, wherein the signal processor is configured to receive the corresponding electrical signal from each optical sensor of the plurality of optical sensors and to provide an object location code representative of the object identification code and the physical location code of the location transmitter to which the location identifier is in closest proximity.

30. An airfield ground surface location system comprising:

a location transmitter positioned at a location on an airfield and comprising:

a light source adapted to receive power from a power source; and

a location encoder having a physical location code (PLC) representative of the location stored therein and configured to generate an optical signal encoded with the PLC by turning the power to the light source on and off based on the PLC; and

a location identifier adapted to couple to a vehicle and comprising:

an optical receiver configured to receive and convert the optical signal to an electrical signal;

a signal processor having a vehicle code representative of the vehicle stored therein and configured to decode the PLC from the electrical signal and to provide a vehicle location code representative of the vehicle code and the PLC; and

a transmitter configured to transmit an identification signal representative of the vehicle location code.

31. The system of claim 30, further comprising:

a plurality of location transmitters positioned at a plurality of locations within the coverage area, each location transmitter having stored therein a corresponding physical location code representative of the location at which it is positioned and each configured to transmit an optical signal representative of the corresponding physical location code.

32. The system of claim 30, wherein the location identifier is further configured to receive a plurality of optical signals and to transmit a signal representative of the

object identification code and the physical location code of the location transmitter to which the location identifier is in closet proximity.

33. The system of claim 30, wherein the light source comprises an a light emitting diode (LED) array.

34. The system of claim 30, wherein the light source comprises a laser diode.

35. The system of claim 30, wherein the light fixture comprises an airfield guidance marker.

36. The system of claim 30, wherein the location encoder comprises:

a power switch connectable to the power source and having a control gate and configured to provide power to the light source;

a microcontroller having the physical location code stored therein and configured to provide to the control gate a power switch control signal representative of the physical location code that causes the power switch to turn the power to the light source on and off to generate the optical signal.

37. The system of claim 36, wherein the light source is turned on and off at a flash rate above a maximum rate perceptible to humans.

38. The system of claim 36, wherein the power switch control signal comprises a serial data stream encoded with the physical location code by the signal processor using the Manchester coding scheme.

39. The system of claim 38, wherein the power switch control signal provides a fifty percent duty cycle to the power switch.

40. The system of claim 30, wherein the location transmitter further comprises:

an infrared setup port configured to receive an infrared signal representative of a physical location code and to provide the physical location code to the location encoder.

41. The system of claim 30, wherein the optical receiver further comprises:

a plurality of optical sensors each configured to receive and convert a separate optical signal representative of a physical location code into a corresponding electrical signal.

42. The system of claim 41, wherein the signal processor is configured to receive the corresponding electrical signal from each optical sensor of the plurality of optical sensors and to provide an object location code representative of the object identification code and the physical location code of the location transmitter to which the location identifier is in closest proximity.

43. The system of claim 30, wherein the vehicle is an aircraft and the object identification code includes a tail number component and flight number component associated with the aircraft, wherein the tail number component is stored in the location identifier and the location identifier is further configured to receive the flight number component from a memory within the aircraft.

44. The system of claim 30, wherein the location identifier is adapted to couple to an underbody of the aircraft.

45. The system of claim 30, further comprising:

a data receiving system configured to receive the identification signal and to provide identification of the object and its location within the coverage area.

46. The system of claim 45, wherein the data receiving system provides identification of the corresponding object and its location within the coverage area on a visual display, wherein the identification includes a tail number and a flight when the object is an aircraft.

47. A method for identifying an object and its location within a defined area, the method comprising:

transmitting from a plurality of locations within the defined area a different digital optical signal with each digital optical signal being representative of the location from which it is transmitted;

receiving the digital optical signals at the object and determining the nearest location from which a digital optical signal was received; and

transmitting from the object an identification signal representative of the object and of the nearest location from which an optical was received.

48. A method of identifying a vehicle and its location on an airfield, the method comprising:

positioning a plurality of airfield guide markers at different locations on the airfield, each guide marker having a light source;

transmitting via each light source an optical signal representative of the different location of the corresponding airfield guide marker;

receiving the optical signals at the vehicle;

determining the nearest known location from which a digital optical signal was received; and

transmitting from the vehicle an identification signal representative of the vehicle and of the different location of the corresponding guide marker in closest proximity to the vehicle from which an optical signal was received.

49. The method of claim 48, wherein the vehicle comprises an aircraft and the identification signal is further representative of a tail number and flight number associated with the aircraft.

50. The method of claim 48, further comprising:

receiving the vehicle identification signal and identifying the vehicle on a visual display.

51. An aircraft system comprising:

an aircraft having a fuselage and having an associated tail number; and

a location identifier coupled to the fuselage, the location identifier having stored therein an object identification code representative of the aircraft and configured to receive an optical signal representative of a physical location code corresponding to a location within the boundaries of an airfield, and configured to transmit an identification signal representative of the object identification code and the physical location code.

52. The system of claim 51, wherein the location identifier comprises:

an optical receiver configured to receive and convert the optical signal to an electrical signal;

a signal processor having the object identification code stored therein and configured to receive the electrical signal and to provide an object

location code representative of the object identification code and the physical location code; and

a transmitter configured to transmit an identification signal representative of the object location code.

53. The system of claim 51, wherein the object identification code includes the tail number and a flight number associated with the aircraft, wherein the tail number is stored within the location identifier and the location identifier is configured to receive the flight number from a memory within the aircraft.

54. The system of claim 51,wherein the location identifier is mounted to an underside of the fuselage in front of a front wheel of the aircraft.

55. An airfield guidance marker comprising:

a light source adapted to receive power from a power source; and

a location encoder having a physical location code (PLC) representative of a location on an airfield at which the airfield guidance marker is positioned, the location encoder configured to generate an optical signal encoded with the PLC by turning the power to the light source on and off based on the PLC.

56. The guidance marker of claim 55, wherein the light source comprises an array of light emitting diodes.

57. The guidance marker of claim 55, wherein the light source comprises a laser diode.

58. The guidance marker of claim 55, wherein the location encoder comprises:

a power switch connectable to the power source and having a control gate, the power switch configured to provide power to the light source; and

a microcontroller having the PLC stored therein and configured to provide to the control gate a power switch control signal representative of the PLC that causes the power switch to turn the power to the light source on and off to generate the optical signal.

59. The guidance marker of claim 55, further comprising:

an infrared setup port configured to receive an infrared signal representative of a PLC and to provide the PLC to the location encoder.